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CHEMICAL MANAGEMENT OF TUBE ROSE COLLAR ROT CAUSED BY *SCLEROTIUM ROLFSII*

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ABSTRACT

Sclerotium rolfsii is one of the important fungal pathogen that causes collar rot in tube rose resulting substantial yield losses. Six fungicides namely Tilt (proploconazole),OPUS (epoxiconazole),Calixin (tridemorph), Indofil M-45(mancozeb),Blitox-50 (Cupper oxychloride) and Bavistin (Carbendazim) were evaluated against Sclerotium rolfsii causing collar rot of tube rose. Epoxiconazole @ 50 µg/ml gave complete inhibition of mycelial growth of the pathogen, whereas carbendazim (Bavistin) @ 500 µg/ml failed to inhibit the growth of the pathogen. Proploconazole and mancozeb @ 100 µg/ml successfully inhibit the growth of radial mycelia of Sclerotium rolfsii inciting collar-rot of tuberose.

KEYWORDS: Tube Roseo, Collar Rot, Sclerotium Rolfsii, Chemical Management, Fungicides

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Original Article

INTRODUCTION

Tube rose (polianthes tuberose L.), one of the most popular ornamental crops. It has gained considerable importance due to its varied uses. It is cultivate on commercial scale in France, Italy, South Africa, North Carolina, U.S.A and in many tropical and subtropical countries including India. Cut flowers of tuberose have great demand for indoor decoration especially in the metropolitan cities like Delhi, Calcutta, Madras, Bombay and Bangalore. Tube rose cultivation on a commercial scale is mainly confined to Midanapore and Nadia districts of West Bengal, Darahalli and Bangalore of Karnataka, Pune and thane districts of Maharastra, Coimbatore district of Tamilnadu and Lucknow of Uttar Pradesh. At present the total area under tuberose cultivation in India is estimated to be about 20,000 ha. However, there exists a consider gap between demand and supply.

Recently, commercial cultivation of tuberose has importance in Orissa for its uses as garlands, bouquets, cut-flowers and decorating marriage functions through the year. The area under tuberose is rapidly expanding by bringing new areas under cultivation around big cities and towns. Tube rose is attacked by a large number of fungal and bacterial pathogens. Sclerotium rolfsii is one of the important fungal pathogen that causes collar rot resulting substantial yield losses. The pathogen attacks the collar portion of plant, which ultimately leads to its death. The infection leads to the drying of lower leaves and eventually the whole plant dries giving a typical symptom of wilting. Due to extensive cultivation of tube rose in non-traditional areas, the pathogen has emerged as a major constraint in its successful cultivation. In Orissa, the malady is rapidly gaining momentum inflicting heavy damage to this valuable commercial; ornamental crop in city suburbs of Bhubaneswar in recent years Managing the collar rot without chemicals means is impossible therefore, an attempt was made to manage the disease through most effective fungicides..

MATERIALS AND METHODS

The plant samples were collected from farmers field. Each sample was labelled properly and taken into laboratory for examination of incidence of collar rot caused by Sclerotium rolfsii.

Isolation of Pathogens

With the moist blotter method recommended by ISIA(1953,1961), the diseased plant sample collected were washed and diseased collar parts were cut into pieces which were then washed and diseased collar parts were cut into pieces which were then disinfected with 1:1000 (0.1%) mercuric chloride solution. These were transferred to PDA slants after several washing in sterile water and incubated at 280C+-10C. The culture were maintained by sub-culturing to time PDA slants.

The pure cculture was obtained by transferring a young immature white Sclerotium from culture tube to a fresh PDA slant and incubated for 9-10 days.From this culture a young white Sclerotium was again transferred to sterilised PDA slant. Thus a pure culture was obtained and maintained by sub culturing.

Evaluation of Fungicide in Invitro

To evaluate the relative fungitoxicity of 6 fungicides at different concentration viz. 50,100,200,500,1000g/ml on the growth of the fungus was determined by following poison food technique (Schmita,1930). The fungicide used were Tilt (proploconazole),OPUS (epoxiconazole),Calixin (tridemorph),Indofil M-45(mancozeb),Blitox-50 (Cupper oxychloride) and Bavistin (Carbendazim).

The required concentration of the individual fungicide was prepared as follows 1g a.i. of the fungicide dissloved in 100ml of sterile water gives 10000 g/ml stock solution of the coumpound. From the stock solution required quantity of the solution was added to the medium to make the final volume 100ml and thus the desired concentration were prepared.

A seven day old culture of S.rolfsii previously maintained in PDA was used for inoculation. Agar disc of 5mm size was cut in sterilized cork borer and was transferred to the middle of the prepared media. The diameter of the fungus colony was measured when in untreated medium there was full growth.

RESULTS AND DISCUSSIONS

Inhibition of radial mycelia growth of S.rolfsii recorded on PDA after six days of incubation in 90 mm petriplates impregnated with different doses of fungicides maintained at 28+-1^{0}C are presented in table 1 and illustrated in figure 1. It was evident from the observation that all the fungicides tested were more or less effective against S. Rolfsii in inhibiting mycellial growth. There was significant difference among fungicides in inhibiting linear mycelia growth of the fungus at all concentration used except 1000µg/ml. At the lowest concentration (50µg/ml) cent percent inhibition of mycelia growth was achieved in epoxiconzole. Systematic fungicide viz. Epoxlconazole and propioconazole were found highly toxic to the mycelia inhibitant as evident from the complete mycelia inhibition at lower doses. In view of that toxicity in vitro this two fungicide may be recommended to control the disease only after in vivo test. The finding partly agree with that of Tiwari (1985). Who achieved success in habiting infection of S. Rolfsii causing root rot in sunflower and gram using triozole group of fungicide (Contaf) of the traditional contact fungicide mancozeb against S. Rolfsii was demonstrated in other crop (Chaturbedi and Agarwal ,1975).

The least inhibition of 16.6% was noted in copper oxychloride at this dose.Triodemorph also found effective in complete inhibitant of mycellial growth of the fungus at 200 µg/ml. Or above that concentration. The word of Siddaramiah et.al. (1979) support the present findings. At 500(µg/ml) substantial growth reduction was seen in copper oxychloride at this dose

Carbendazim has been reported effective against S. Rolfsii causing root-rot in different crops. (Mukhopadhayay and Thakur, 1971; Siddaramiah, 1979, Lal and Nagarajan,1983; Waraitc et al, 1986; Tiwari,1995) Siddaramiah, (1979) claimed good mycelia inhibition of S. Rolfsii in tridemorph isolated from groundnut. Mancozeb was suggested as seed treatment for the control of sclerotial wilt of ground nut (Dhamnikar and Peshney, 1982; Pati and Rane, 1982). Recently a trizole group of fungicide (hexaconazole) was reported successful in controlling root/collar-rot of gram and sunflowet by soil drench in vivo. However, there is no information, regarding the performance of propioconazole and expioconazole against S. Rolfsii inciting collar-rot in any crops. Probably this forms the first new information on propioconazole and expioconazole. For the control of S. Rolfsii causing collar rot in tube rose. Brassicol (PCNB) highly effective against sclerotial wilt / ropt of many crops (Amma and Shanmuhgam,1974; Sharma, et.al. ,1974;Mythi and Sen ,1979) However, is now out of market thus these two fungicides may be used as very good substitute of pentachloronitrobenzine in the control of soil burn pathogen like S. Rolfsii.

CONCLUSIONS

At 100(µg/ml) all the fungicides successfully reduced the entire mycelia growth. Although in vitro study have indicated the efficacy of certain fungicides the field evaluation is further needed to conform their bio efficacy as well as their impact on flower yield and benefit cost ratio before recommendation to tuberose growers.

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APPENDICES

Table 1: Effect of Different Fungicides on Per Cent Inhibition of Radial Mycelia Growth of *S. rolfsii* Inciting Collar-Rot of Tuberose

Fungicide	Conentration (Mg/Ml)				
	50	100	200	500	1000
Tilt(propioconazole)	53.6 (47.11)	100.0 (90.00)	100.0 (90.00)	100.0 (90.00)	100.0 (90.00)
Opus(Epoxiconazole)	100.0 (90.0)	100.0 (90.0)	100.0 (90.0)	100.0 (90.0)	100.0 (90.0)
Calixin(Tridemorph)	20.0 (26.45)	66.6 (54.58)	100.0 (90.00)	100.0 (90.00)	100.0 (90.00)
Indofile M-45(mancozeb)	45.6 (42.50)	100.0 (90.0)	100.0 (90.0)	100.0 (90.0)	100.0 (90.0)
Blitox-50(Copper oxychloride)	16.6 (24.03)	35.0 (36.24)	48.3 (44.03)	73.3 58.93)	100.0 (90.00)
Bavistin(carbendazim)	21.6 (27.71)	46.6 (43.08)	66.6 (54.78)	76.6 (61.14)	100.0 (90.00)
SE (m)+ =	(1.67)	(1.21)	(1.32)	(0.64)	(N.S)
C.D.(0.05)	(5.15)	(3.73)	(4.07)	(1.97)	

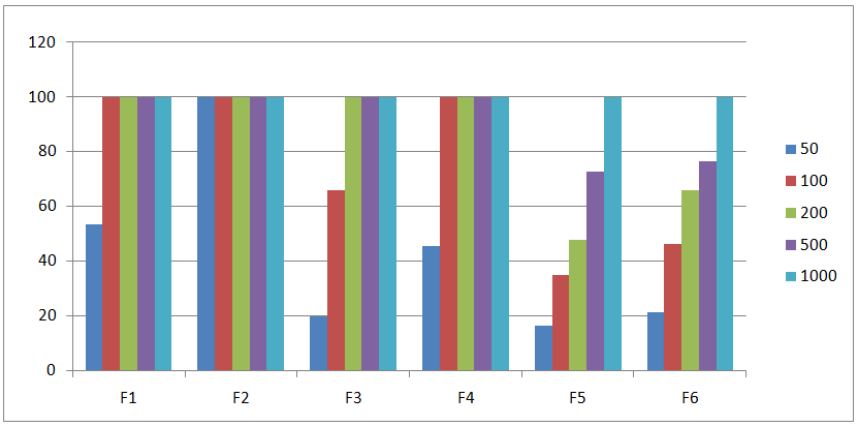

Figure 1: Effect of Different Fungicides on Per Cent Inhibition of Radial Mycelia Growth of *S. rolfsii* Inciting Collar-Rot of Tuberose